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Old Company Name in Catalogs and Other Documents

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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Not recommended
for new design

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BIPOLAR ANALOG INTEGRATED CIRCUIT

μ PC24M00A Series

THREE TERMINAL LOW DROPOUT VOLTAGE REGULATOR

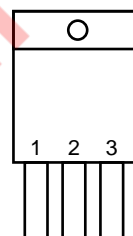
DESCRIPTION

μ PC24M00A Series are low dropout regulators which have 500 mA capable for output current. These ICs are built-in the saturation protection circuit of the output transistor.

FEATURES

- Built-in the saturaiton protection circuit of the output transistor.
- The capability of output current is 500 mA.
- High accuracy of output voltage.
 - $|\Delta V_o| \leq \pm 2\%$ ($T_J = 25\text{ }^\circ\text{C}$)
 - $|\Delta V_o| \leq \pm 3\%$ ($0\text{ }^\circ\text{C} \leq T_J \leq 125\text{ }^\circ\text{C}$)
- Low dropout voltage.
 - $V_{DIF} \leq 1\text{ V}$ ($I_o \leq 500\text{ mA}$, $T_J \leq 125\text{ }^\circ\text{C}$)
- Built-in overcurrent protection circuit, thermal shut-down circuit.
- Built-in Safe Operating Area protection circuit.
- Compatible for μ PC24M00 Series.

CONNECTION DIAGRAM (TOP VIEW)

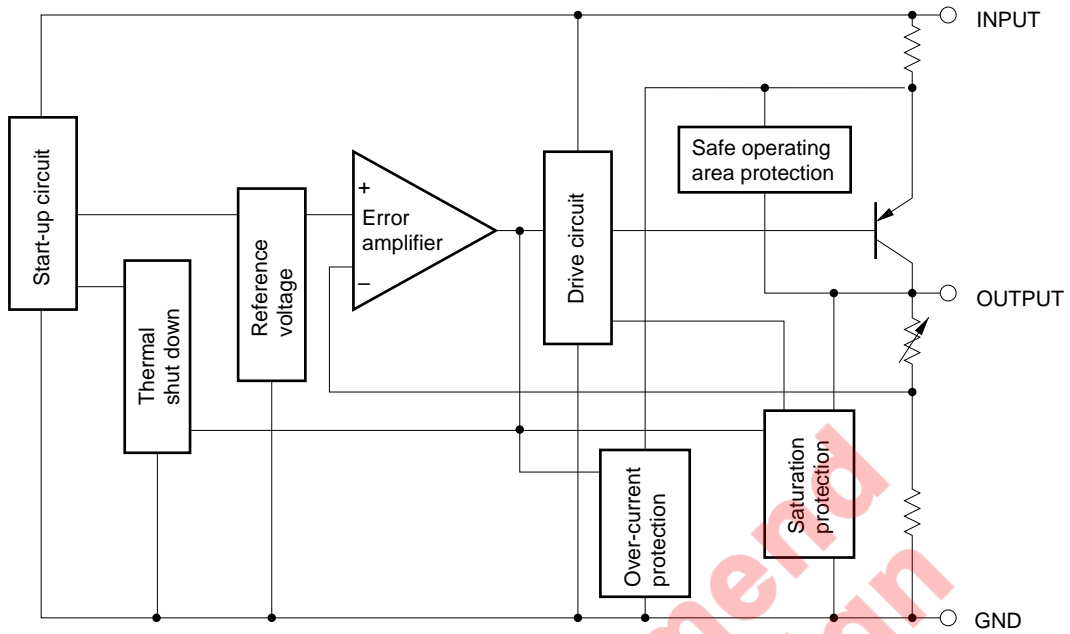


1 : INPUT
2 : GND
3 : OUTPUT

ORDERING INFORMATION

| Output Voltage | Type Number | Package |
|----------------|------------------|-----------------------------|
| 5 V | μ PC24M05AHF | MP-45G (Isolated TO-220) |
| 6 V | μ PC24M06AHF | |
| 7 V | μ PC24M07AHF | |
| 8 V | μ PC24M08AHF | |
| 9 V | μ PC24M09AHF | |
| 10 V | μ PC24M10AHF | |
| 12 V | μ PC24M12AHF | |
| 15 V | μ PC24M15AHF | |
| 18 V | μ PC24M18AHF | |

BLOCK DIAGRAM



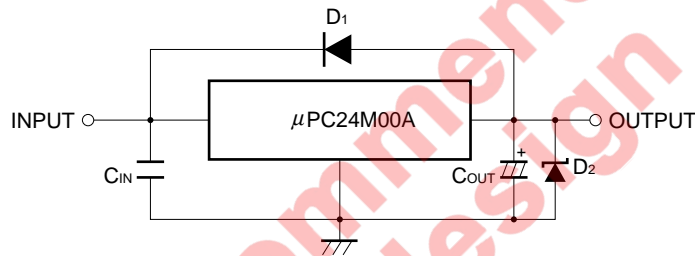
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ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, Unless otherwise specified.)

| PARAMETER | SYMBOL | RATING | UNIT |
|--|------------------------|----------------|------|
| Input Voltage | V _{IN} | 36 | V |
| Internal Power Dissipation | P _T | 15 Note | W |
| Operating Ambient Temperature Range | T _A | -20 to +85 | °C |
| Operating Junction Temperature Range | T _J | -20 to +150 | °C |
| Storage Temperature Range | T _{stg} | -55 to +150 | °C |
| Thermal Resistance (Junction to Case) | R _{th(J - C)} | 7.0 | °C/W |
| Thermal Resistance (Junction to Ambient) | R _{th(J - A)} | 65 | °C/W |

Note Internally limited.

TYPICAL CONNECTION



- C_{IN} : 0.1 to 0.47 μF.
- C_{OUT} : More than 47 μF.
- D₁ : Need for V_O > V_{IN}.
- D₂ : Need for V_O < GND.

RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | TYPE NUMBER | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|-----------------|-------------|------|------|------|------|
| Input Voltage | V _{IN} | μPC24M05AHF | 6 | 9 | 20 | V |
| | | μPC24M06AHF | 7 | 10 | 21 | |
| | | μPC24M07AHF | 8 | 11 | 22 | |
| | | μPC24M08AHF | 9 | 13 | 23 | |
| | | μPC24M09AHF | 10 | 14 | 24 | |
| | | μPC24M10AHF | 11 | 15 | 25 | |
| | | μPC24M12AHF | 13 | 18 | 27 | |
| | | μPC24M15AHF | 16 | 22 | 27 | |
| | | μPC24M18AHF | 19 | 25 | 28 | |
| Output Current | I _O | All | 0 | | 500 | mA |
| Operating Ambient Temperature Range | T _A | All | -20 | | +85 | °C |
| Operating Junction Temperature Range | T _J | All | -20 | | +125 | °C |

ELECTRICAL CHARACTERISTICS

μPC24M05A (V_{IN} = 9 V, I_o = 350 mA, T_J = 25 °C, Unless otherwise specified)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|----------------------|------|------|------|-------------------|--|
| Output Voltage | V _o | 4.9 | 5.0 | 5.1 | V | |
| | | 4.85 | | 5.15 | | 6 V ≤ V _{IN} ≤ 20 V, 5 mA ≤ I _o ≤ 350 mA, 0 °C ≤ T _J ≤ 125 °C |
| | | 4.85 | | 5.15 | | 5 mA ≤ I _o ≤ 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Line Regulation | REG _{IN} | | 5 | 50 | mV | 6.5 V ≤ V _{IN} ≤ 20 V |
| Load Regulation | REG _L | | 3 | 25 | mV | 5 mA ≤ I _o ≤ 500 mA |
| Quiescent Current | I _{BIAS} | | 2.3 | 3.2 | mA | I _o = 0 |
| | | | 7 | 30 | | I _o = 500 mA |
| Start-up Current | I _{BIAS(S)} | | | 15 | mA | V _{IN} = 4.5 V, I _o = 0 mA |
| | | | | 45 | | V _{IN} = 4.5 V, I _o = 500 mA |
| Quiescent Current Change | ΔI _{BIAS} | | | 10 | mA | 6.5 V ≤ V _{IN} ≤ 20 V, I _o = 500 mA |
| Output Noise Voltage | V _n | | 90 | | μV _{rms} | 10 Hz ≤ f ≤ 100 kHz |
| Ripple Rejection | R·R | 55 | 60 | | dB | f = 120 Hz, 6.5 V ≤ V _{IN} ≤ 16.5 V |
| Dropout Voltage | V _{DIF} | | 0.5 | 1.0 | V | I _o = 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Short Circuit Current | I _{short} | | 0.6 | | A | V _{IN} = 20 V |
| Peak Output Current | I _{opeak} | 0.75 | 1.0 | 1.63 | A | V _{IN} = 9 V |
| Temperature Coefficient of Output Voltage | ΔV _o /ΔT | | 0.2 | | mV/°C | I _o = 5 mA, 0 °C ≤ T _J ≤ 125 °C |

μPC24M06A (V_{IN} = 10 V, I_o = 350 mA, T_J = 25 °C, Unless otherwise specified)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|----------------------|------|------|------|-------------------|--|
| Output Voltage | V _o | 5.88 | 6.0 | 6.12 | V | |
| | | 5.82 | | 6.18 | | 7 V ≤ V _{IN} ≤ 21 V, 5 mA ≤ I _o ≤ 350 mA, 0 °C ≤ T _J ≤ 125 °C |
| | | 5.82 | | 6.18 | | 5 mA ≤ I _o ≤ 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Line Regulation | REG _{IN} | | 6 | 60 | mV | 7.5 V ≤ V _{IN} ≤ 21 V |
| Load Regulation | REG _L | | 4 | 30 | mV | 5 mA ≤ I _o ≤ 500 mA |
| Quiescent Current | I _{BIAS} | | 2.3 | 3.2 | mA | I _o = 0 |
| | | | 7 | 30 | | I _o = 500 mA |
| Start-up Current | I _{BIAS(S)} | | | 15 | mA | V _{IN} = 5.5 V, I _o = 0 mA |
| | | | | 45 | | V _{IN} = 5.5 V, I _o = 500 mA |
| Quiescent Current Change | ΔI _{BIAS} | | | 10 | mA | 7.5 V ≤ V _{IN} ≤ 21 V, I _o = 500 mA |
| Output Noise Voltage | V _n | | 110 | | μV _{rms} | 10 Hz ≤ f ≤ 100 kHz |
| Ripple Rejection | R·R | 53 | 58 | | dB | f = 120 Hz, 7.5 V ≤ V _{IN} ≤ 17.5 V |
| Dropout Voltage | V _{DIF} | | 0.5 | 1.0 | V | I _o = 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Short Circuit Current | I _{short} | | 0.6 | | A | V _{IN} = 21 V |
| Peak Output Current | I _{opeak} | 0.75 | 1.0 | 1.63 | A | V _{IN} = 10 V |
| Temperature Coefficient of Output Voltage | ΔV _o /ΔT | | -0.4 | | mV/°C | I _o = 5 mA, 0 °C ≤ T _J ≤ 125 °C |

μPC24M07A ($V_{IN} = 11\text{ V}$, $I_o = 350\text{ mA}$, $T_J = 25\text{ °C}$, Unless otherwise specified)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|-----------------------|------|------|------|---------------|--|
| Output Voltage | V_o | 6.86 | 7.0 | 7.14 | V | |
| | | 6.79 | | 7.21 | | $8\text{ V} \leq V_{IN} \leq 22\text{ V}$, $5\text{ mA} \leq I_o \leq 350\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |
| | | 6.79 | | 7.21 | | $5\text{ mA} \leq I_o \leq 500\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |
| Line Regulation | REG_{IN} | | 7 | 70 | mV | $8.5\text{ V} \leq V_{IN} \leq 22\text{ V}$ |
| Load Regulation | REG_L | | 4 | 35 | mV | $5\text{ mA} \leq I_o \leq 500\text{ mA}$ |
| Quiescent Current | I_{BIAS} | | 2.3 | 3.2 | mA | $I_o = 0$ |
| | | | 7 | 30 | | $I_o = 500\text{ mA}$ |
| Start-up Current | $I_{BIAS(S)}$ | | | 15 | mA | $V_{IN} = 6.5\text{ V}$, $I_o = 0\text{ mA}$ |
| | | | | 45 | | $V_{IN} = 6.5\text{ V}$, $I_o = 500\text{ mA}$ |
| Quiescent Current Change | ΔI_{BIAS} | | | 10 | mA | $8.5\text{ V} \leq V_{IN} \leq 22\text{ V}$, $I_o = 500\text{ mA}$ |
| Output Noise Voltage | V_n | | 130 | | μV_{rms} | $10\text{ Hz} \leq f \leq 100\text{ kHz}$ |
| Ripple Rejection | R·R | 52 | 57 | | dB | $f = 120\text{ Hz}$, $8.5\text{ V} \leq V_{IN} \leq 18.5\text{ V}$ |
| Dropout Voltage | V_{DIF} | | 0.5 | 1.0 | V | $I_o = 500\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |
| Short Circuit Current | I_{short} | | 0.6 | | A | $V_{IN} = 22\text{ V}$ |
| Peak Output Current | I_{peak} | 0.75 | 1.0 | 1.63 | A | $V_{IN} = 11\text{ V}$ |
| Temperature Coefficient of Output Voltage | $\Delta V_o/\Delta T$ | | 0.4 | | $mV/°C$ | $I_o = 5\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |

μPC24M08A ($V_{IN} = 13\text{ V}$, $I_o = 350\text{ mA}$, $T_J = 25\text{ °C}$, Unless otherwise specified)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|-----------------------|------|------|------|---------------|--|
| Output Voltage | V_o | 7.85 | 8.0 | 8.15 | V | |
| | | 7.75 | | 8.25 | | $9\text{ V} \leq V_{IN} \leq 23\text{ V}$, $5\text{ mA} \leq I_o \leq 350\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |
| | | 7.75 | | 8.25 | | $5\text{ mA} \leq I_o \leq 500\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |
| Line Regulation | REG_{IN} | | 8 | 80 | mV | $9.5\text{ V} \leq V_{IN} \leq 23\text{ V}$ |
| Load Regulation | REG_L | | 5 | 40 | mV | $5\text{ mA} \leq I_o \leq 500\text{ mA}$ |
| Quiescent Current | I_{BIAS} | | 2.3 | 3.2 | mA | $I_o = 0$ |
| | | | 7 | 30 | | $I_o = 500\text{ mA}$ |
| Start-up Current | $I_{BIAS(S)}$ | | | 15 | mA | $V_{IN} = 7.5\text{ V}$, $I_o = 0\text{ mA}$ |
| | | | | 45 | | $V_{IN} = 7.5\text{ V}$, $I_o = 500\text{ mA}$ |
| Quiescent Current Change | ΔI_{BIAS} | | | 10 | mA | $9.5\text{ V} \leq V_{IN} \leq 23\text{ V}$, $I_o = 500\text{ mA}$ |
| Output Noise Voltage | V_n | | 150 | | μV_{rms} | $10\text{ Hz} \leq f \leq 100\text{ kHz}$ |
| Ripple Rejection | R·R | 51 | 56 | | dB | $f = 120\text{ Hz}$, $9.5\text{ V} \leq V_{IN} \leq 19.5\text{ V}$ |
| Dropout Voltage | V_{DIF} | | 0.5 | 1.0 | V | $I_o = 500\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |
| Short Circuit Current | I_{short} | | 0.5 | | A | $V_{IN} = 23\text{ V}$ |
| Peak Output Current | I_{peak} | 0.74 | 1.0 | 1.62 | A | $V_{IN} = 13\text{ V}$ |
| Temperature Coefficient of Output Voltage | $\Delta V_o/\Delta T$ | | 0.8 | | $mV/°C$ | $I_o = 5\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |

μPC24M09A (V_{IN} = 14 V, I_o = 350 mA, T_J = 25 °C, Unless otherwise specified)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|----------------------|------|------|------|-------------------|---|
| Output Voltage | V _o | 8.82 | 9.0 | 9.18 | V | |
| | | 8.73 | | 9.27 | | 10 V ≤ V _{IN} ≤ 24 V, 5 mA ≤ I _o ≤ 350 mA, 0 °C ≤ T _J ≤ 125 °C |
| | | 8.73 | | 9.27 | | 5 mA ≤ I _o ≤ 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Line Regulation | REG _{IN} | | 9 | 90 | mV | 10.5 V ≤ V _{IN} ≤ 24 V |
| Load Regulation | REG _L | | 5 | 45 | mV | 5 mA ≤ I _o ≤ 500 mA |
| Quiescent Current | I _{BIAS} | | 2.4 | 3.2 | mA | I _o = 0 |
| | | | 7 | 30 | | I _o = 500 mA |
| Start-up Current | I _{BIAS(S)} | | | 15 | mA | V _{IN} = 8.5 V, I _o = 0 mA |
| | | | | 45 | | V _{IN} = 8.5 V, I _o = 500 mA |
| Quiescent Current Change | ΔI _{BIAS} | | | 10 | mA | 10.5 V ≤ V _{IN} ≤ 24 V, I _o = 500 mA |
| Output Noise Voltage | V _n | | 170 | | μV _{rms} | 10 Hz ≤ f ≤ 100 kHz |
| Ripple Rejection | R·R | 50 | 55 | | dB | f = 120 Hz, 10.5 V ≤ V _{IN} ≤ 20.5 V |
| Dropout Voltage | V _{DIF} | | 0.5 | 1.0 | V | I _o = 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Short Circuit Current | I _{o short} | | 0.5 | | A | V _{IN} = 24 V |
| Peak Output Current | I _{o peak} | 0.74 | 1.0 | 1.62 | A | V _{IN} = 14 V |
| Temperature Coefficient of Output Voltage | ΔV _o /ΔT | | 1.0 | | mV/°C | I _o = 5 mA, 0 °C ≤ T _J ≤ 125 °C |

μPC24M10A (V_{IN} = 15 V, I_o = 350 mA, T_J = 25 °C, Unless otherwise specified)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|----------------------|------|------|------|-------------------|---|
| Output Voltage | V _o | 9.8 | 10 | 10.2 | V | |
| | | 9.7 | | 10.3 | | 11 V ≤ V _{IN} ≤ 25 V, 5 mA ≤ I _o ≤ 350 mA, 0 °C ≤ T _J ≤ 125 °C |
| | | 9.7 | | 10.3 | | 5 mA ≤ I _o ≤ 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Line Regulation | REG _{IN} | | 10 | 100 | mV | 11.5 V ≤ V _{IN} ≤ 25 V |
| Load Regulation | REG _L | | 6 | 50 | mV | 5 mA ≤ I _o ≤ 500 mA |
| Quiescent Current | I _{BIAS} | | 2.4 | 3.2 | mA | I _o = 0 |
| | | | 7 | 30 | | I _o = 500 mA |
| Start-up Current | I _{BIAS(S)} | | | 15 | mA | V _{IN} = 9.5 V, I _o = 0 mA |
| | | | | 45 | | V _{IN} = 9.5 V, I _o = 500 mA |
| Quiescent Current Change | ΔI _{BIAS} | | | 10 | mA | 11.5 V ≤ V _{IN} ≤ 25 V, I _o = 500 mA |
| Output Noise Voltage | V _n | | 190 | | μV _{rms} | 10 Hz ≤ f ≤ 100 kHz |
| Ripple Rejection | R·R | 49 | 54 | | dB | f = 120 Hz, 11.5 V ≤ V _{IN} ≤ 21.5 V |
| Dropout Voltage | V _{DIF} | | 0.5 | 1.0 | V | I _o = 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Short Circuit Current | I _{o short} | | 0.4 | | A | V _{IN} = 25 V |
| Peak Output Current | I _{o peak} | 0.74 | 1.0 | 1.62 | A | V _{IN} = 15 V |
| Temperature Coefficient of Output Voltage | ΔV _o /ΔT | | 1.6 | | mV/°C | I _o = 5 mA, 0 °C ≤ T _J ≤ 125 °C |

μPC24M12A (V_{IN} = 18 V, I_o = 350 mA, T_J = 25 °C, Unless otherwise specified)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|----------------------|-------|------|-------|-------------------|---|
| Output Voltage | V _o | 11.75 | 12 | 12.25 | V | |
| | | 11.65 | | 12.35 | | 13 V ≤ V _{IN} ≤ 27 V, 5 mA ≤ I _o ≤ 350 mA, 0 °C ≤ T _J ≤ 125 °C |
| | | 11.65 | | 12.35 | | 5 mA ≤ I _o ≤ 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Line Regulation | REG _{IN} | | 12 | 120 | mV | 14 V ≤ V _{IN} ≤ 27 V |
| Load Regulation | REG _L | | 7 | 60 | mV | 5 mA ≤ I _o ≤ 500 mA |
| Quiescent Current | I _{BIAS} | | 2.4 | 3.2 | mA | I _o = 0 |
| | | | 8 | 30 | | I _o = 500 mA |
| Start-up Current | I _{BIAS(S)} | | | 15 | mA | V _{IN} = 11.5 V, I _o = 0 mA |
| | | | | 45 | | V _{IN} = 11.5 V, I _o = 500 mA |
| Quiescent Current Change | ΔI _{BIAS} | | | 10 | mA | 14 V ≤ V _{IN} ≤ 27 V, I _o = 500 mA |
| Output Noise Voltage | V _n | | 230 | | μV _{rms} | 10 Hz ≤ f ≤ 100 kHz |
| Ripple Rejection | R·R | 47 | 52 | | dB | f = 120 Hz, 14 V ≤ V _{IN} ≤ 24 V |
| Dropout Voltage | V _{DIF} | | 0.5 | 1.0 | V | I _o = 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Short Circuit Current | I _{short} | | 0.4 | | A | V _{IN} = 27 V |
| Peak Output Current | I _{opeak} | 0.73 | 1.0 | 1.61 | A | V _{IN} = 18 V |
| Temperature Coefficient of Output Voltage | ΔV _o /ΔT | | 0.7 | | mV/°C | I _o = 5 mA, 0 °C ≤ T _J ≤ 125 °C |

μPC24M15A (V_{IN} = 22 V, I_o = 350 mA, T_J = 25 °C, Unless otherwise specified)

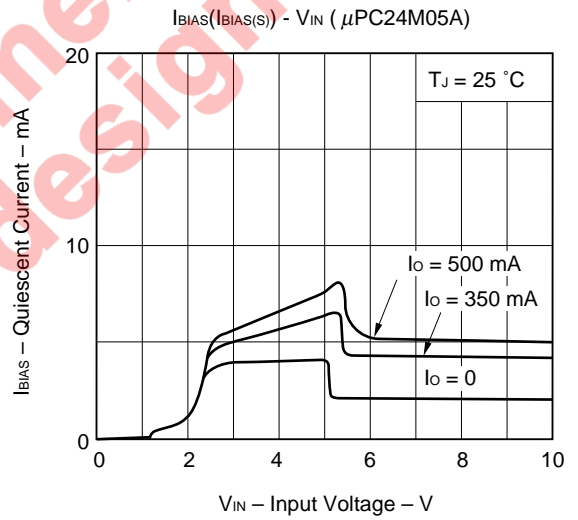
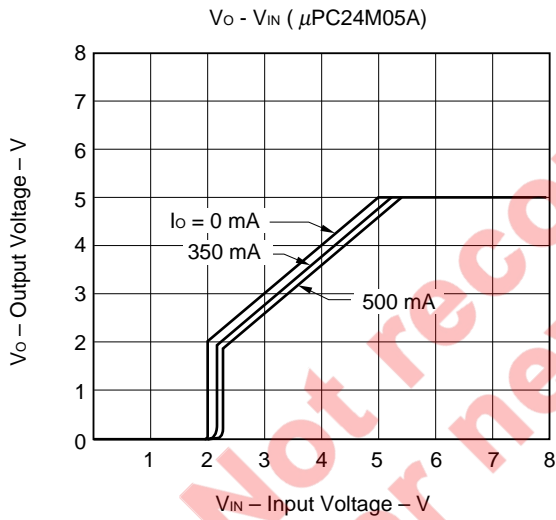
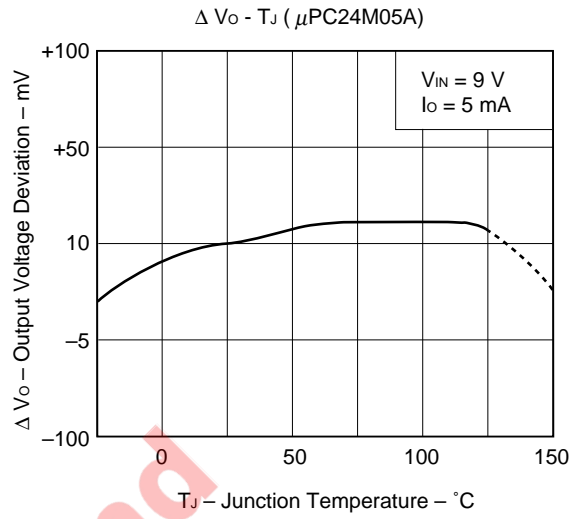
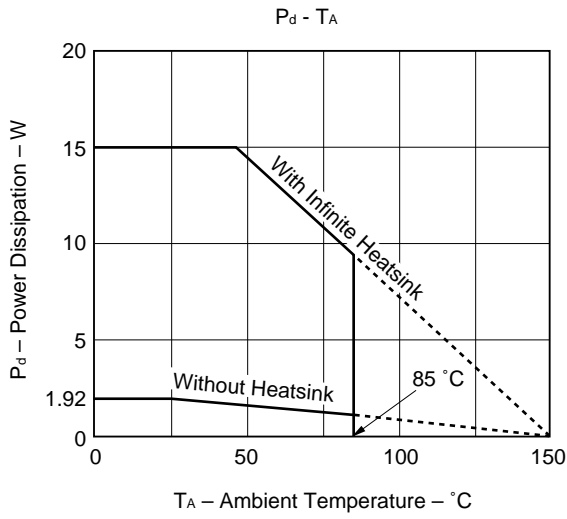
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|----------------------|-------|------|-------|-------------------|---|
| Output Voltage | V _o | 14.7 | 15 | 15.3 | V | |
| | | 14.55 | | 15.45 | | 16 V ≤ V _{IN} ≤ 27 V, 5 mA ≤ I _o ≤ 350 mA, 0 °C ≤ T _J ≤ 125 °C |
| | | 14.55 | | 15.45 | | 5 mA ≤ I _o ≤ 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Line Regulation | REG _{IN} | | 15 | 150 | mV | 17 V ≤ V _{IN} ≤ 27 V |
| Load Regulation | REG _L | | 9 | 75 | mV | 5 mA ≤ I _o ≤ 500 mA |
| Quiescent Current | I _{BIAS} | | 2.5 | 3.2 | mA | I _o = 0 |
| | | | 8 | 30 | | I _o = 500 mA |
| Start-up Current | I _{BIAS(S)} | | | 15 | mA | V _{IN} = 14.5 V, I _o = 0 mA |
| | | | | 45 | | V _{IN} = 14.5 V, I _o = 500 mA |
| Quiescent Current Change | ΔI _{BIAS} | | | 10 | mA | 17 V ≤ V _{IN} ≤ 27 V, I _o = 500 mA |
| Output Noise Voltage | V _n | | 290 | | μV _{rms} | 10 Hz ≤ f ≤ 100 kHz |
| Ripple Rejection | R·R | 46 | 51 | | dB | f = 120 Hz, 17 V ≤ V _{IN} ≤ 27 V |
| Dropout Voltage | V _{DIF} | | 0.5 | 1.0 | V | I _o = 500 mA, 0 °C ≤ T _J ≤ 125 °C |
| Short Circuit Current | I _{short} | | 0.4 | | A | V _{IN} = 27 V |
| Peak Output Current | I _{opeak} | 0.72 | 1.0 | 1.6 | A | V _{IN} = 22 V |
| Temperature Coefficient of Output Voltage | ΔV _o /ΔT | | 1.6 | | mV/°C | I _o = 5 mA, 0 °C ≤ T _J ≤ 125 °C |

μPC24M18A ($V_{IN} = 25\text{ V}$, $I_o = 350\text{ mA}$, $T_J = 25\text{ °C}$, Unless otherwise specified)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|-----------------------|-------|------|-------|---------------|---|
| Output Voltage | V_o | 17.64 | 18 | 18.36 | V | |
| | | 17.46 | | 18.54 | | $19\text{ V} \leq V_{IN} \leq 28\text{ V}$, $5\text{ mA} \leq I_o \leq 350\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |
| | | 17.46 | | 18.54 | | $5\text{ mA} \leq I_o \leq 500\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |
| Line Regulation | REG_{IN} | | 18 | 180 | mV | $20\text{ V} \leq V_{IN} \leq 28\text{ V}$ |
| Load Regulation | REG_L | | 11 | 90 | mV | $5\text{ mA} \leq I_o \leq 500\text{ mA}$ |
| Quiescent Current | I_{BIAS} | | 2.5 | 3.2 | mA | $I_o = 0$ |
| | | | 8 | 30 | | $I_o = 500\text{ mA}$ |
| Start-up Current | $I_{BIAS(S)}$ | | | 15 | mA | $V_{IN} = 17.5\text{ V}$, $I_o = 0\text{ mA}$ |
| | | | | 45 | | $V_{IN} = 17.5\text{ V}$, $I_o = 500\text{ mA}$ |
| Quiescent Current Change | ΔI_{BIAS} | | | 10 | mA | $20\text{ V} \leq V_{IN} \leq 28\text{ V}$, $I_o = 500\text{ mA}$ |
| Output Noise Voltage | V_n | | 350 | | μV_{rms} | $10\text{ Hz} \leq f \leq 100\text{ kHz}$ |
| Ripple Rejection | R·R | 44 | 49 | | dB | $f = 120\text{ Hz}$, $20\text{ V} \leq V_{IN} \leq 28\text{ V}$ |
| Dropout Voltage | V_{DIF} | | 0.5 | 1.0 | V | $I_o = 500\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |
| Short Circuit Current | I_{Oshort} | | 0.4 | | A | $V_{IN} = 28\text{ V}$ |
| Peak Output Current | I_{Opeak} | 0.72 | 1.0 | 1.6 | A | $V_{IN} = 25\text{ V}$ |
| Temperature Coefficient of Output Voltage | $\Delta V_o/\Delta T$ | | 2.2 | | mV/°C | $I_o = 5\text{ mA}$, $0\text{ °C} \leq T_J \leq 125\text{ °C}$ |

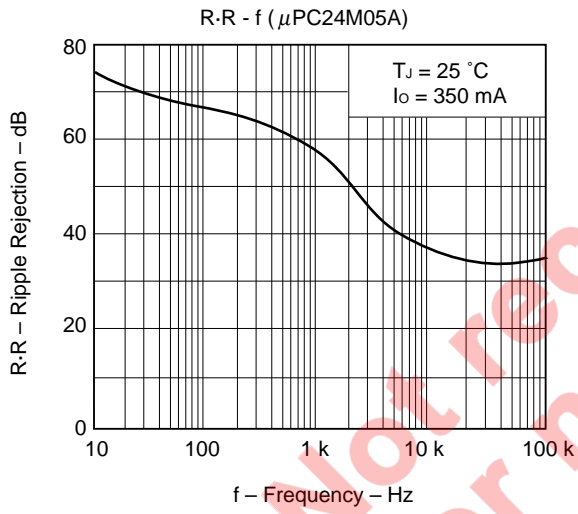
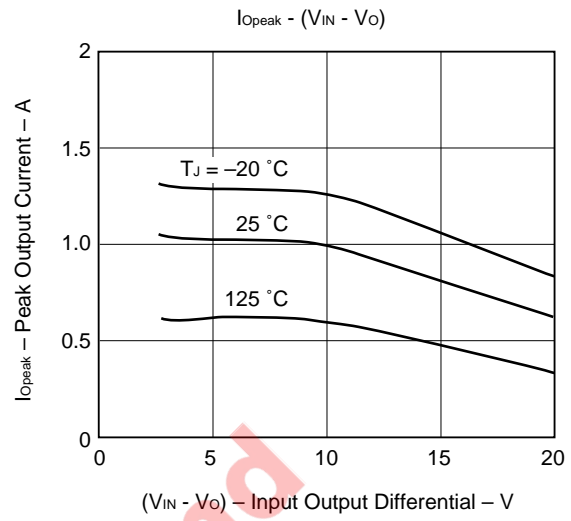
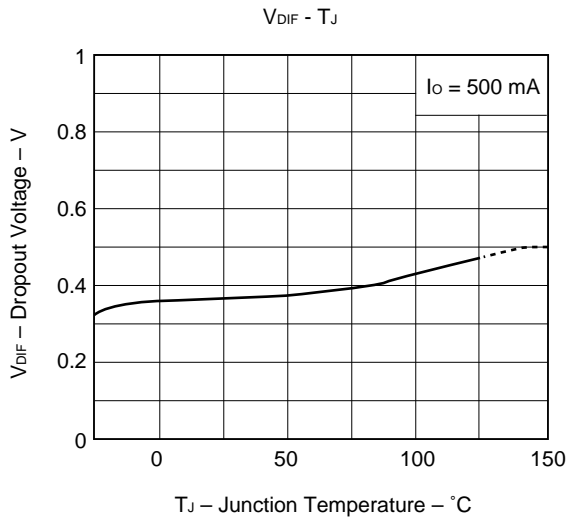
Not recommended for new designs

TYPICAL CHARACTERISTICS



Not recommended for new design

TYPICAL CHARACTERISTICS

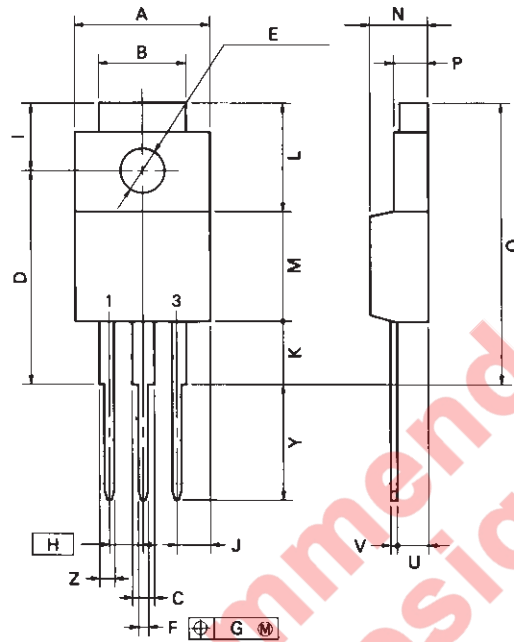


Not recommended for new design

PACKAGE DIMENSIONS (Unit: mm)

μPC24M00AHF Series

3PIN PLASTIC SIP (MP-45G)



P3HF-254B-1

NOTE

Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.

Not recommended for new design

| ITEM | MILLIMETERS | INCHES |
|------|-----------------------|---|
| A | 10.4 MAX. | 0.410 MAX. |
| B | 7.0 | 0.276 |
| C | 1.2 MIN. | 0.047 MIN. |
| D | 17.0 ^{±0.3} | 0.669 ^{+0.013} _{-0.012} |
| E | φ3.3 ^{±0.2} | φ0.130 ^{+0.008} |
| F | 0.75 ^{±0.10} | 0.030 ^{+0.004} _{-0.006} |
| G | 0.25 | 0.010 |
| H | 2.54 (T.P.) | 0.100 (T.P.) |
| I | 5.0 ^{±0.3} | 0.197 ^{±0.012} |
| J | 2.66 MAX. | 0.105 MAX. |
| K | 4.8 MIN. | 0.188 MIN. |
| L | 8.5 | 0.335 |
| M | 8.5 | 0.335 |
| N | 4.5 ^{±0.2} | 0.177 ^{±0.008} |
| P | 2.8 ^{±0.2} | 0.110 ^{+0.003} _{-0.006} |
| Q | 22.4 MAX. | 0.882 MAX. |
| U | 2.4 ^{±0.5} | 0.094 ^{+0.021} _{-0.020} |
| V | 0.65 ^{±0.10} | 0.026 ^{+0.004} _{-0.006} |
| Y | 8.9 ^{±0.7} | 0.350 ^{±0.028} |
| Z | 1.0 MIN. | 0.039 MIN. |

RECOMMENDED SOLDERING CONDITIONS

The following conditions (see table below) must be met when soldering this product.

Please consult with our sales offices in case other soldering process is used, or in case soldering is done under different conditions.

TYPES OF THROUGH HOLE MOUNT DEVICE

μPC24M00AHF Series

| Soldering Process | Soldering Conditions | Symbol |
|-------------------|---|--------|
| Wave soldering | Solder temperature: 260 °C or below. Flow Time: 10 seconds or below. | |

REFERENCE

| Document Name | Document No. |
|---|--------------|
| NEC semiconductor device reliability/quality control system | IEI-1212 |
| Quality grade on NEC semiconductor devices | IEI-1209 |
| Semiconductor device mounting technology manual | IEI-1207 |
| Semiconductor device package manual | IEI-1213 |
| Guide to quality assurance for semiconductor devices | MEI-1202 |
| Semiconductor selection guide | MF-1134 |

Not recommended for new design

[MEMO]

**Not recommend
for new design**

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NEC devices are classified into the following three quality grades:

“Standard”, “Special”, and “Specific”. The Specific quality grade applies only to devices developed based on a customer designated “quality assurance program” for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices in “Standard” unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact NEC Sales Representative in advance.

Anti-radioactive design is not implemented in this product.